TRIPLE 2-CHANNEL MULTIPLEXER

■ GENERAL DESCRIPTION

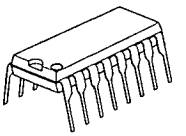
The NJU4053B is a triple 2-channel multiplexer with three independent control inputs and an inhibit input.

The three control input signals select 1 of a pair of channels to be turned on and connect them to the three outputs.

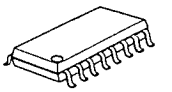
The operating voltage is as wide as 3 to 18V and the quiescent current is as low as 5μA max.(at V_{DD}=5V).

It is equivalent to RCA CD4053B and Motorola MC14053B.

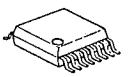
■ PACKAGE OUTLINE



NJU4053BD



NJU4053BM

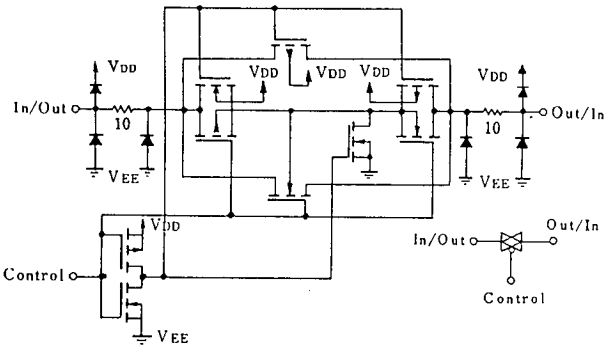


NJU4053BV

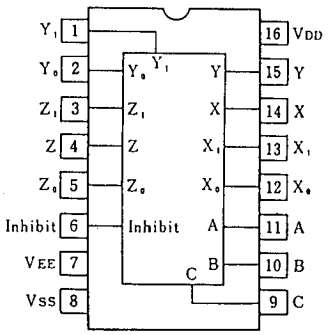
■ FEATURES

- High ON/OFF Output Voltage Ratio --- 65dB Typ.(R_L=10kΩ)
- Low Quiescent Current --- 5μA Typ. at V_{DD}=5V
- Low Crosstalk between channels --- 80dB Typ.
- Wide Operating Voltage --- 3 ～ 18V
- Linearity in the transfer characteristics. ΔRON<60Ω(V_{IN}=V_{DD}～V_{EE}, V_{DD}=15V)
- Package Outline --- DIP/DMP/SSOP 16
- C-MOS Technology

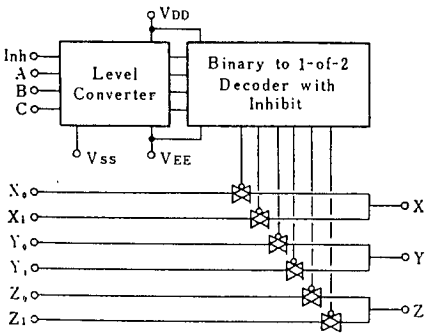
■ EQUIVALENT CIRCUIT



■ PIN CONFIGURATION



■ BLOCK DIAGRAM



■ TRUTH TABLE

INH	C	B	A	On Switch		
0	0	0	0	Z_0	Y_0	X_0
0	0	0	1	Z_0	Y_0	X_1
0	0	1	0	Z_0	Y_1	X_0
0	0	1	1	Z_0	Y_1	X_1
0	1	0	0	Z_1	Y_0	X_0
0	1	0	1	Z_1	Y_0	X_1
0	1	1	0	Z_1	Y_1	X_0
0	1	1	1	Z_1	Y_1	X_1
1	x	x	x	None		

x: Don't Care

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD} - V_{EE}	- 0.5 ～ + 20	V
Input Voltage(Control Signal)	V_{IN}	V_{SS}-0.5 ～ V_{DD}+0.5	V
Input Voltage(Analog Signal)	V_{SIG}	V_{EE}-0.5 ～ V_{DD}+0.5	V
Input Current	I_{IN}	± 10	mA
Output Current	I_{OUT}	± 10	mA
Power Dissipation	P_D	500 (DIP) 200 (DMP) 300 (SSOP)	mW
Operating Temperature Range	Topr	- 40 ～ + 85	℃
Storage Temperature Range	Tstg	- 65 ～ + 150	℃

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■ ELECTRICAL CHARACTERISTICS

・ DC Characteristics

(V_{SS}=0V)

PARAMETER	SYMBOL	CONDITIONS		V_{DD} (V)	Ta=-40℃ MIN	Ta=-40℃ MAX	Ta=25℃ MIN	Ta=25℃ TYP	Ta=25℃ MAX	Ta=85℃ MIN	Ta=85℃ MAX	UNIT
Quiescent Current	I_{DD}	No signal Per Package		5 10 15 20		5 10 20 100			5 10 20 100		150 300 600 3000	μA
On-State Resistance	R_{ON}	$0 \leqq V_{is} \leqq V_{DD}$ V_{EE}=V_{SS}=0V		5 10 15		500 210 140		220 100 60	600 250 160		800 300 200	Ω
On-State Resistance Deviation	$\triangle R_{ON}$	Between 2 channels V_{EE}=V_{SS}=0V		5 10 15				15 10 5				Ω
Off-Channel Leakage Current		Each channel V_{EE}=V_{SS}=0V		18		±1000			±10 ±100		±1000	nA
Input Capacitance	C_{IN}	V_{IN}=0V Control Inhibit Switch						5.0 10	7.5			pF
Low Level Input Voltage	V_{IL}	R_L=10kΩ SW=V_{DD} V_{EE}=V_{SS}	Vo=1.0V Vo=1.0V Vo=1.5V	5 10 15		1.5 3.0 4.0			1.5 3.0 4.0		1.5 3.0 4.0	V
High Level Input Voltage	V_{IH}		Vo=4.0V Vo=9.0V Vo=13.5V	5 10 15	3.5 7.0 11.0		3.5 7.0 11.0			3.5 7.0 11.0		V
Input Current	±I_{IN}	V_{IN}=0 or 18V		18		±0.1			±0.1		± 1	μA

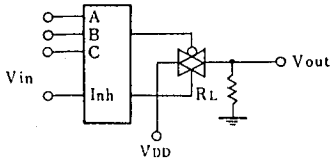
■ SWITCHING CHARACTERISTICS

(Ta=25°C, C_L=50pF)

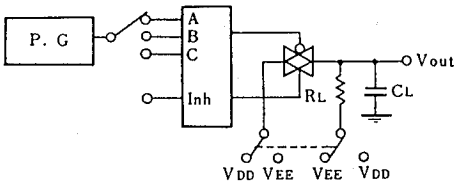
PARAMETER		SYMBOL	CONDITIONS	V_{DD}(V)	MIN	TYP	MAX	UNIT
Propagation Delay Time	SW Input to Output	t_{PLH}	R_L=10kΩ	5		15	45	ns
				10		8	30	
				15		5	20	
		t_{PHL}		5		15	45	
				10		8	30	
				15		5	20	
	CONT Input to Output	t_{PHL}		5		450	1000	ns
				10		200	500	
				15		150	400	
		t_{PZH}		5		450	1000	
				10		200	500	
		t_{PZL}		15		150	400	
Output Enable Time		t_{PHZ}	R_L=10kΩ	5		600	1400	ns
				10		250	700	
		t_{PLZ}		15		200	500	
Output Disable Time				5		600	1400	ns
				10		250	700	
				15		200	500	
Sine-Wave Distortion			R_L=10kΩ, f=1kHz, V_{IS}=5V_{P-P}	10		0.05		%
Feedthrough (all-ch. off)			R_L=1kΩ, 20$\log_{10}V_{OS}/V_{IS}$=-50dB	10		4.5		MHz
Crosstalk	SW A to B		R_L=1kΩ, V_{IS}=1/2(V_{DD}-V_{SS})$_{P-P}$	10		3.0		MHz
	Control-Out		R_1=1kΩ, R_L=10kΩ, tr=tf=20ns CONTROL/INHIBIT	10		30		mV

■ MEASUREMENT CIRCUITS

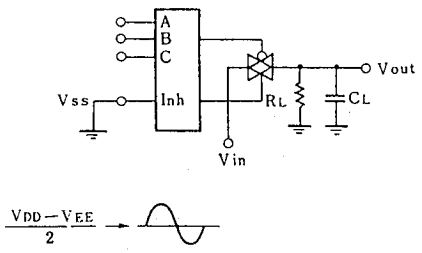
1. Noise Margin



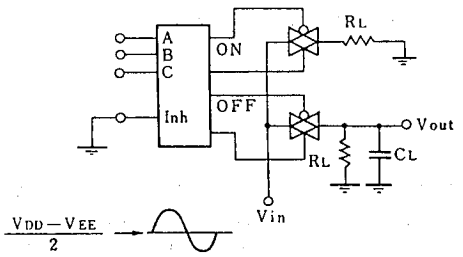
2. Propagation Delay



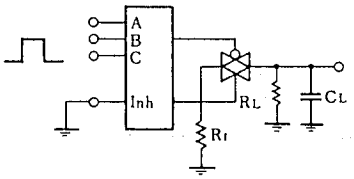
3. Feedthrough



4. Crosstalk (Switch A and B)



5. Crosstalk (Control and Out)



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